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7.1.6 Paints and Wall Coverings

An enormous range of paints and wall coverings are available, but the market is increasingly dominated by just two: latex paint and vinyl wall covering. The most significant environmental concern with most wall coverings is their potential for emitting volatile organic compounds, or VOCs. Also, by affecting the ability of moisture to migrate through a wall surface, coatings and wall coverings can affect the potential for condensation and microbial growth in buildings. Other considerations include the raw materials used to make the products, additives used to install and finish them, durability, and disposal or recycling at the end of their useful life.

Opportunities

Low-VOC, even zero-VOC, paints and adhesives are a good choice in most situations to protect the health of installers and avoid the buildup of contaminants in a building. When recoating or repapering walls in occupied facilities, however, zero-VOC coatings are especially useful. They can be applied adjacent to occupied spaces during regular business hours with minimal disruption or complaints, continued staff productivity, and little or no need for overtime pay.

Technical Information

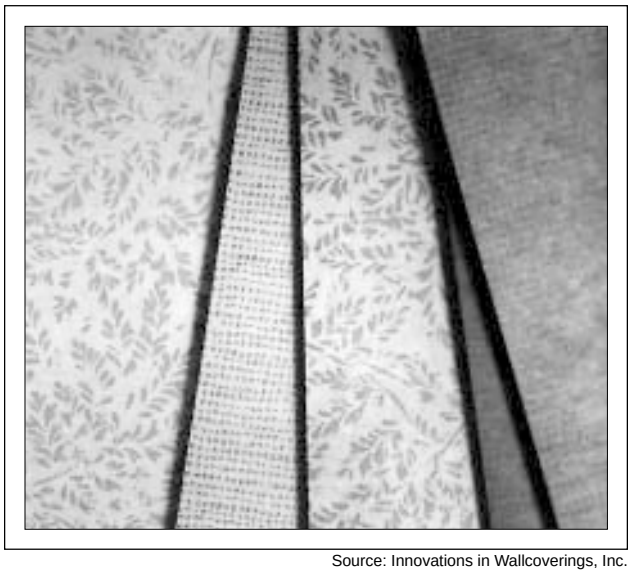
Light-colored surfaces, regardless of the material, can save energy by reducing the amount of light that must be introduced to illuminate the space. Carefully designed horizontal surfaces and ceilings can bounce daylight from perimeter windows or interior skylights deep into the building (see *Section 4.1.2 – Daylighting Design*).

Paints are composed of three main constituents: carriers, binders, and the pigments that give them their color. Water-based or latex paints use water as the carrier, acrylic or polyvinyl acetate latex as the binder, and various mineral and organic pigments; the primary white pigment is titanium dioxide. Latex paints also require additives to prevent the growth of mildew, both in the can and on the painted surface. Oil-based paints traditionally use some kind of solvent as the carrier (although this practice is increasingly rare because of air quality regulations), alkyd resins as the binder, and pigments similar to those in latex paints.

As of September 1999, Federal air quality standards restrict VOC levels in most flat paints to 250 grams per liter, and in nonflat paints to 380 grams per liter. Some jurisdictions restrict allowable VOC levels even further. Such regulations are effectively eliminating oil-based paints as a viable option for most applications. Even where oil-based paints are still available, they may be reformulated to meet the new regulations, and these new formulations may not perform as well as the originals.

Even though they do not use solvents as the carrier, most latex paints contain some solvents to emulsify the binder, so they still emit VOCs. In response to health and odor concerns, nearly every major paint manufacturer also offers a line of "low-free" or "zero-VOC" paints. Some paints that are nominally zero-VOC still use a solvent-based pigmenting system, so saturated colors in these paint lines may contain significant levels of VOCs.

For applications where peak performance and color selection are not critical, there are "recycled" paints made largely of leftover paint collected from consumers or industrial users. Depending on the source, these recycled paints may be more or less carefully tested and reprocessed to provide consistent performance characteristics. For obvious reasons, recycled paint is not as available in white as it is in browns and grays.



Source: Innovations in Wallcoverings, Inc.

Introduced in 1999, the Allegory® commercial wall coverings are composed of 50% wood fiber and 50% spun-woven polyester with inks that contain no heavy metals or formaldehyde. Though they are not scrubbable, their moisture-permeability will cut down on mold problems that can occur with vinyl wall coverings in humid environments.

Source: Sherwin-Williams

Although zero-VOC paints are considered a niche market—with strong interest from specifiers but slow-growing awareness on the part of consumers—most major manufacturers now have their own line.

Traditional wallpaper has been all-but-replaced with vinyl wall coverings because of the latter's superior durability and cleanability. Vinyl wall coverings provide moisture resistance for "wet" areas such as restrooms and food preparation areas. Vinyl, or PVC, is produced from vinyl chloride, which is a known carcinogen. Vinyl wall coverings also can be a source of VOC emissions from the plasticizers used to make the material flexible. Vinyl wall covering should be avoided in hot, humid climates, where cool indoor temperatures can cause condensation on the back of the wall covering.

Wall covering application systems can be water-based or solvent-based, strippable or nonstrippable. Strippable wallpapers allow for the removal of wall coverings without energy-intensive stripping processes. Water-based adhesives contain lower VOC levels than solvent-based adhesives but potentially perform less effectively; therefore, they require more attention to the weight of the paper, location, and quality of installation for their successful use.

Fabric wall coverings can adsorb and rerelease VOCs, depending on their area, porosity, and texture. The integration of low-maintenance, durable wall coverings with acoustical performance requires consideration of the wall construction, geometry, height, and location.

Facility managers should ensure scheduling of drying times for wet-applied finishing materials, such as paints and adhesives, to avoid the accumulation of VOCs in the interior environment and protect installers and occupants from high levels of exposure. Renovations that occur adjacent to occupied spaces have the potential to allow the infiltration of VOCs from work areas to occupied spaces. Facility managers can ensure that precautions are taken to seal off work spaces from occupied space and to isolate entrances and storage areas from occupied spaces. During application of any VOC-releasing product, direct-to-outdoors ventilation should be provided to prevent distribution of VOCs throughout the facility. Under no circumstances should VOC-laden air be circulated through a central air distribution system.

References

GreenSpec: The Environmental Building News Product Directory and Guideline Specifications, BuildingGreen, Inc., Brattleboro, VT, 1999; (800) 861-0954; www.greenspec.com.

Demkin, Joseph, AIA, ed., *Environmental Resource Guide*, John Wiley & Sons, New York, NY, 1999.

Contacts

Aberdeen Proving Ground Pollution Prevention Program, www.apg.army.mil/AP2G/index.htm.

Green Seal, Inc., Washington, DC; (202) 872-6400, (202) 872-4324 (fax); www.greenseal.org. Provides green labeling standards for paints (GS-11) and anticorrosive paints (GS-03).

The Department of the Army's Aberdeen Proving Ground worked with the nonprofit ecolabelling organization Green Seal, Inc., and Dynamac, Inc., to identify environmentally preferable paints for use on site. Based on Green Seal's consensus-based standards, appropriate thresholds were determined for VOC levels, and toxic constituents that should be avoided were identified. For 178 paints in use at the Proving Ground, Green Seal first reviewed Material Safety Data Sheets and then tested promising products for VOCs and toxins. As a result of this process, 24 paints were recommended as environmentally responsible choices. They represented flat, semigloss, and gloss finishes for both indoor and outdoor use.